

LIST OF CURRENT CLAIMS

Claims 1-55 (Canceled).

56. (Currently Amended) A process for the solid phase continuous polymerisation of polyesters, comprising the steps of:

[[-]] preparing a mass of polyester prepolymer granules, ~~of comprising~~ at least one polyester;

[[-]] feeding said polyester prepolymer granules to a crystallizer and heating them ~~where they are heated up to a suitable temperature of about 140°C to about 235°C~~ to cause the crystallisation of the granules;

[[-]] feeding said crystallised granules ~~at a temperature comprised in the range 170°C - 235°C~~ into a generally at least an horizontal, cylindrical, rotary heated, first rotating reactor, said first reactor being slightly inclined downwardly from a feeding end thereof;

[[-]] producing a purge gas flow inside said first reactor to increase the intrinsic viscosity of said at least one polyester.[[;]]

~~causing the intrinsic viscosity (IV) increase of said at least one polyester by making said granules move forward through said reactor (15) according to a plug flow behaviour thanks to its rotation and inclination.~~

57. (Withdrawn and Currently Amended) [[A]] The process according to claim 56, wherein said first reactor contains ~~provides~~ no internal baffles.

58. (Withdrawn and Currently Amended) [[A]] The process according to claim 56, wherein the minimum ~~crystallisation~~ degree of crystallisation (X_c) of ~~said the~~ polyester granules fed into said first reactor is ~~comprised~~ in the range of 0-70% θ - 70%, and wherein said first reactor rotates at a speed ~~comprised~~ of between 0.1 and 10 r.p.m., and wherein the angle of inclination (α) of said first reactor with respect to the horizontal plane is ~~comprised~~ between 0.1 and 3.5°.

59. (Currently Amended) [[A]] The process according to claim 56, wherein the ~~said~~

polyester granules fed into said first reactor have a temperature ~~comprised~~ in the range of 185-225° C.

60. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein said ~~the~~ polyester granules fed into said first reactor have a temperature ~~comprised~~ in the range of 180-230° C.

61. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein said ~~the~~ polyester granules fed into said first reactor have a crystallisation degree (X_c) ~~[[>]]~~ greater than 10%.

62. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein said ~~the~~ polyester granules fed into said first reactor have a crystallisation degree (X_c) ~~[[>]]~~ greater than 20%.

63. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein said ~~the~~ polyester granules fed into said first reactor have a minimum crystallisation degree (X_c) ~~comprised~~ in the range of 0 - 70% ~~0 ÷ 50%~~.

64. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein the rotation of said first reactor occurs around its own central axis (S).

65. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein said first reactor rotates at a speed ~~comprised~~ between 0.1 and 2.0 r.p.m..

66. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein the angle of inclination (α) of said first reactor with respect to the horizontal plane is ~~comprised~~ between 3.0 and 12.0°.

67. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein downstream of said first reactor at least a second horizontal, cylindrical, rotating ~~rotary~~, slightly inclined reactor is provided.

68. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 67, wherein said granules move from said first ~~one~~ reactor to the second reactor ~~subsequent one~~ by gravity.

69. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 67, wherein the temperature of the polyester granules, subjected to the polymerisation passing through said reactors, is increased during the movement from ~~one~~ the first reactor to the second reactor ~~subsequent of a value comprised between 2 and 20° C.~~

70. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 67, wherein the temperature of the polyester granules passing through said reactors is decreased between said first ~~from one~~ reactor and the second reactor ~~to the subsequent of a value comprised between 2 and 10° C.~~

71. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 69, wherein the temperature of the polyester granules exiting the first ~~one~~ reactor is increased by means of an intermediate pre-heater located before the entrance into the second ~~subsequent~~ reactor.

72. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 67, wherein the polymerisation temperature in ~~[[a]]~~ the first reactor is lower than the polymerisation temperature in ~~[[a]]~~ the second reactor ~~located downstream said first reactor.~~

73. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 70, wherein the temperature of the polyester granules exiting ~~one~~ the first reactor is decreased by means of an intermediate cooler located before ~~the~~ an entrance into the ~~subsequent~~ second reactor.

74. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 56,

wherein the ratio between the length of said the first reactor and its diameter of reactor is $[[>]]$ greater than 5.

75. (Withdrawn and Currently Amended) $[[A]]$ The process according to claim 56, wherein the ratio between the residual volume in said first reactor inside which said granules have been fed, and its unloaded volume is $[[>]]$ greater than 0.1.

76. (Withdrawn and Currently Amended) $[[A]]$ The process according to claim 56, wherein the flow regime of the polyester granules inside the first reactor is characterised by a Froude Number $Fr = (\omega^2 \cdot R/g)$ ~~comprised~~ in the range of $1 \cdot 10^{-4}$ $[[\div]]$ 0.5, where ω is the angular velocity of the first reactor; R is the internal radius of the first reactor and g is the gravity acceleration = 9.806 m/s².

77. (Withdrawn and Currently Amended) $[[A]]$ The process according to claim 56, wherein the temperature inside said first ~~at least one~~ reactor is maintained at a constant value $\pm 10^\circ$ C.

78. (Withdrawn and Currently Amended) $[[A]]$ The process according to claim 56, wherein the internal diameter of said first reactor is ~~comprised~~ between 0.5 and 10 meters.

79. (Withdrawn and Currently Amended) $[[A]]$ The process according to claim 56, wherein the internal diameter of said first reactor is ~~comprised~~ between 0.3 and 6 meters.

80. (Withdrawn and Currently Amended) $[[A]]$ The process according to claim 56, wherein the flow of said purge gas in said first reactor is conveyed in an opposite direction with respect to the flow direction of said granules that pass through said first reactor.

81. (Withdrawn and Currently Amended) $[[A]]$ The process according to claim 56, wherein the flow of said purge gas in said first reactor is conveyed in the same

direction with respect to the flow direction of said granules that pass through said first reactor.

82. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein the ratio between the mass of the purge gas flow that passes through said first reactor and the mass of the polyester granules in the first reactor is ~~[[>]]~~ greater than 0.62.

83. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein the ratio between the mass of the purge gas flow that passes through said first reactor and the mass of the polyester granules in the first reactor is ~~[[>]]~~ greater than 0.9.

84. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein said purge gas is an inert gas or air.

85. (Currently Amended) ~~[[A]]~~ The process according to claims 56, wherein said purge gas is air with a dew point less than -30° C ~~<-30° C~~.

86. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein ~~said the~~ purge gas is a mixture of gases chosen from the group consisting of nitrogen, noble gases, carbon dioxide, carbon monoxide and oxygen, and wherein the oxygen content is less than ~~[[<]]~~ 10% by weight.

87. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein said purge gas is a mixture of gases chosen from the group consisting of nitrogen, noble gases, carbon dioxide, carbon monoxide and oxygen, and wherein the oxygen content is less than ~~[[<]]~~ 6% by weight.

88. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein the purge gas has been purified of organic impurities to a level less than or equal to 100 p.p.m. by weight (CH₄ equivalent) and is then ~~[[is]]~~ recycled to the first reactor, ~~after having~~

~~been purified of the organic impurities, until a level of organic impurities ≤ 100 p.p.m. by weight (CH_4 equivalent) has been reached.~~

89. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein said at least one polyester is polyester having at least about 75% of its acid moieties provided by terephthalic acid polyethylene terephthalate or PET.

90. (Currently Amended) ~~[[A]]~~ The process according to claim 89, wherein said ~~polyethylene terephthalate or PET~~ the polyester has an IPA (~~Isophthalic~~ Isophthalic Acid) content ~~comprised in the range of 1-20%~~ 1-20%.

91. (Currently Amended) ~~[[A]]~~ The process according to claim 89, wherein ~~said the~~ granules of polyester polyethylene terephthalate fed into said first reactor have an intrinsic viscosity ~~comprised in the range between 0.55 and 0.65 dl/g.~~

92. (Currently Amended) ~~[[A]]~~ The process according to claim 89, wherein ~~said the~~ granules of polyester polyethylene terephthalate fed into said first reactor have an intrinsic viscosity ~~comprised in the range between 0.25 and 0.75 dl/g.~~

93. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein said at least one polyester is PEN polyethylene naphthalate.

94. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein said at least one polyester is PBT polybutylene terephthalate polybutylene terephthalate.

95. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein ~~said the~~ granules fed in the first reactor have a carboxyl end groups content in the range of 10 - 45% ~~10-45%.~~

96. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein ~~said the~~ granules are cube-shaped with dimensions ~~comprised~~ volumes between 1 mm^3 and 125 mm^3 .

97. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein ~~said the~~ granules are spherical with a diameter ~~comprised~~ between 1 mm and 5 mm.

98. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein ~~said the~~ granules are extended cylinders of length less than ~~[[<]]~~ 10 mm and circular or square cross-section having, respectively, a diameter or ~~and~~ side less than ~~[[<]]~~ 5 mm.

99. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein ~~said the~~ polyester granules are pancake-like platelets of diameter less than ~~[[<]]~~ 3 mm and thickness less than ~~[[<]]~~ 3 mm.

100. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein ~~said the~~ polyester granules have an irregular shape with a volume ~~comprised~~ between 1 and 125 mm³.

101. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein ~~said the~~ mass of prepolymer crystallised granules is achieved by subjecting the polyester granules to a crystallisation step in a fluidised-bed crystallizer having at least one bed ~~(13)~~, said bed being fluidised by means of a gas flow sufficient to generate the fluidisation of the polyester granules with or without mechanical vibration.

102. (Currently Amended) ~~[[A]]~~ The process according to claim 101, wherein said gases employed for the crystallisation are inert gases or air.

103. (Currently Amended) ~~[[A]]~~ The process according to claim 101, wherein said crystallisation step is performed with a residence time selected from the group consisting of ~~comprised~~ between 2 and 20 minutes and, ~~preferably, from 10 to 15~~ minutes.

104. (Currently Amended) ~~[[A]]~~ The process according to claim 56 ~~404~~, wherein the

granules are heated to cause the crystallisation up to temperatures comprised between ~~140° C and 235° C~~ and preferably in the range 200-225° C.

105. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein the polyester granules inside said first reactor ~~the polyester granules~~ are subjected to at least one of a solid phase polycondensation, and/or drying, and ~~and/or~~ crystallisation ~~and/or~~ dealdehydisation.

106. (Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein the intrinsic viscosity of the polyester is increased ~~[[of]]~~ at least 0.35 dl/g ~~during the solid phase polymerisation.~~

107. (Currently Amended) ~~[[A]]~~ The process according to claim 89, wherein the intrinsic viscosity of the polyester polyethylene terephthalate is increased ~~[[of]]~~ at least 0.4 dl/g ~~during the solid phase polymerisation.~~

108. (Withdrawn and Currently Amended) ~~[[A]]~~ The process according to claim 56, wherein said plant further comprises at least one vertical reactor located upstream and/or downstream of said generally horizontal first reactor ~~rector (15).~~